INSECTS OF MICRONESIA
Diptera: Mycetophilidae

By DONALD H. COLLESS
DIVISION OF ENTOMOLOGY, C.S.I.R.O., CANBERRA, A.C.T.

INTRODUCTION

As far as I am aware, there are no previous records of Mycetophilidae[1] from Micronesia; in fact, very few have been recorded from any of the Pacific islands. The family has been studied to some extent in adjacent areas: in Japan by Okada; in the Malayan subregion principally by Edwards. However, it seems likely that much of the fauna still awaits description, especially in the Oriental Region. For instance, I know of only 11 species recorded from the Philippines and the probably rich fauna of New Guinea is practically unexplored.

The present study is based upon material made available by B. P. Bishop Museum, Hawaii, collected by J. W. Beardsley, R. M. Bohart, H. S. Dybas, J. L. Gressitt, R. W. L. Potts, M. M. Ross, C. W. Sabrosky, and F. M. Snyder. It is unlikely that the material represents anything like a complete sample of the fauna; for example, there are no specimens from the high islands of Ponape and Kusaie, whose rich rain forests must support members of the family. Nevertheless, analysis of composition and distribution in the present sample does show certain interesting features.

Table 1 brings out one striking fact—that 14 of the 18 species come from only two areas: Palau and Bonin Islands. Of the remaining four species, three are from other islands in the Carolines. This is partly owing to the fact that expert dipterists surveyed these islands, but it seems significant that these two principal sources of material have two geographic features in common: fairly high and richly forested uplands, and proximity to lands to the south and west. Since most Mycetophilidae breed in, or are at least associated with, basidiomycetous fungi, they thrive best in areas of moist forest, particularly at lower temperatures. Their chances of establishment would seem slight on atolls or low islands, but quite good in areas such as the Palau and Bonin Islands. Their powers of dispersal are perhaps somewhat limited by body size or habits, and they are very rarely taken in traps

[1] I am following current practice in treating the subfamily Sciarinae, of some authors, as a separate family.

over the ocean (see results of Yoshimoto et al. and Gressitt, et al., Pacific Insects, vols. 2–4). As described below, the degree of endemicity alone suggests that dispersal is very slow; the proximity of the Bonin Islands to Japan and the Palau Islands to New Guinea and the Oriental Region has no doubt operated to build up the largest faunas in those islands.

A second obvious feature is the high degree of endemism—all 18 species are apparently new. This may be due, in part, to our poor knowledge of the faunas of adjacent areas, but is presumably also due to speciation on islands. For instance, the four species of *Orfelia* (*Neoplatyura*) from Palau, Truk, Guam, and the Bonins, though closely related, are all quite distinct. As might be expected, the species from Guam, the most isolated, is the most distinct. Moreover, each island (or group) has only a single species within each genus (or subgenus, in *Orfelia*), and eight genera are represented by only a single species each. The general picture, then, suggests very slow dispersal rates, with correspondingly long periods of isolation.

Although all Micronesian species appear to be endemic, almost all have close relatives in adjacent areas; the exception is *Orfelia micella*, whose relationships remain obscure. The bulk of the fauna appears to have been derived from the Oriental Region, some perhaps via New Guinea. Possible immigrants via the latter route are *Orfelia* (*Neoplatyura*) and *Aspidionia*, both of which seem related to elements of the Australian fauna. Of species found in the Bonin Islands, only one (*Phronia boninensis*) shows a definite link with the Japanese fauna, although others, belonging to widely distributed groups, may well have come from the same quarter. In this as in other cases, our present lack of knowledge of adjacent faunas makes more detailed analysis impossible.

I have used, throughout, the morphological terminology of Edwards (1925)[2] and Tonnoir (1929) with some slight alterations. In wing venation, the anterior branch of the posterior fork is referred to as M3+4 (Cu1 of early authors) and the anal veins as 1A and 2A. Also, the term "postnotum" is used for the "metanotum" or "mediotergite" of some authors. In describing the positions of spines and other characters on the legs, I have followed the convention of imagining the legs held out in the horizontal plane, at right angles to the long axis of the body; their anterior and posterior surfaces are then the "external" and "internal" surfaces of some previous authors.

Types are deposited in U.S. National Museum (US) and Bishop Museum (BISHOP), with the exception of two male and two female paratypes of *Allodia sabroskyi*, in the Australian National Insect Collection, C.S.I.R.O., Canberra.

The United States Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, and Bernice

[2] Dates in parentheses refer to Literature Cited, p. 667.

P. Bishop Museum have made this survey and publication of the results possible. Field research was aided by a contract between the Office of Naval Research, Department of the Navy, and the National Academy of Sciences, NR 160–175. My thanks are due to Miss Neel Key who prepared the illustrations of the wings.

Table 1. Distributional List of Micronesian Mycetophilidae

	Micronesian Island Groups				
			Caroline		
	Bonin	S. Mariana	Palau	Yap	Truk
1. Keroplatus annulipes*			×		
2. Orfelia spinosa*					×
3. O. palauensis*			×		
4. O. petiolata*		×			
5. O. digitata*	×				
6. O. pottsi*					×
7. O. gressitti*				×	
8. O. apicalis*			×		
9. O. micella*			×		
10. Neoempheria vicina*	×				
11. Leia ridens*	×				
12. Manota hamulata*			×		
13. Exechia snyderi*	×				
14. Allodia sabroskyi*			×		
15. Phronia boninensis*	×				
16. Epicypta palauensis*			×		
17. E. boninensis*	×				
18. Aspidionia palauensis*			×		

* Described as new.

SYSTEMATICS

The key below is, as far as possible, a "natural" one, using mainly generic and subgeneric characters. Since additional species of these genera may be found in the future, identifications should always be checked against the more detailed descriptions, particularly when new localities are involved.

KEY TO ADULT MYCETOPHILIDAE OF MICRONESIA

1. Crossvein m-cu present; veins Rs and M1+2 fused for a short distance near their bases (Keroplatinae) 2
   Crossvein m-cu absent; veins Rs and M1+2 not fused, connected (in most cases) by crossvein r-m 10
2. Palp reduced, apparently consisting of a single, porrect segment; antennae very broad and flattened; rather large, stout species .... **1. Keroplatus annulipes**
   Palp normal, apparently 3- or 4-segmented; antennae not conspicuously broad or flattened (slightly so in *O. micella*); smaller, slender species 3
3. Setulae present along some branches of M and/or Cu at least; a row of small, erect setae behind anterior spiracle; vein 1A not reaching wing margin (subgenus *Neoplatyura*) 4
   Setulae absent along branches of M and Cu 7
4. Median fork about level with or proximal to, level of apex of R1 5
   Median fork distinctly distal to level of apex of R1 6
5. Mid tibia with anterior spur less than half length of posterior spur; vein Cu2 distinctly shorter than 1A; in male, veins M1 and M2 markedly convergent, M3+4 curved toward its apex, and macrotrichia abundant ..... **2. Orfelia spinosa**
   Mid tibia with anterior spur rather more than half length of posterior spur; wing with vein Cu2 distinctly longer than 1A; in male, veins M1 and M2 only slightly convergent, M3+4 almost straight, and macrotrichia sparse ...... **5. Orfelia digitata**
6. Mesonotum uniformly brown .... **3. Orfelia palauensis**
   Mesonotum with a pair of large, dark-brown patches laterally above wing roots .... **4. Orfelia petiolata**
7. Tibiae with setulae irregular on about basal half, in regular rows on apical portion; wing with vein 1A reaching margin .... **6. Orfelia pottsi**
   Tibiae with setulae in regular rows throughout; wing with vein 1A not reaching margin 8
8. Wing with vein 1A distinct; veins M2 and M3+4 not reaching margin; a row of small, erect setae present behind anterior spiracle .... **7. Orfelia gressitti**
   Wing with vein 1A scarcely, if at all, developed; veins M2 and M3+4 reaching, or almost reaching, margin; spiracular setae absent 9
9. Wing lacking anal lobe; postnotum with bristles; mid and hind tibiae each with a single spur; brown species .... **8. Orfelia apicalis**
   Wing with anal lobe; postnotum bare; mid and hind tibiae each with two spurs; blackish species .... **9. Orfelia micella**
10. Basal portion and fork of vein M1+2 lacking, only apical portions of M1 and M2 remaining; M3+4 originating near base of wing; palp very long .... **12. Manota hamulata**
    Vein M1+2 forked in the normal manner 11
11. Wing with pattern of dark spots and clouding; vein R4 present; lateral ocelli close together at center of head .... **10. Neoempheria vicina**
    Wing without pattern; vein R4 absent; lateral ocelli close to eye margins 12
12. Crossvein r-m almost longitudinal, about as long as R1; M3+4 incomplete at base, not joined to Cu1; Cu1 sinuous .... **11. Leia ridens**
    Crossvein r-m short, only one-fourth, or less, length of R1; M3+4 absent or, if present, joined basally to Cu1; Cu1 not markedly sinuous 13
13. Anepisternal bristles absent; mid tibia with a long, anterior (external) row of short spines, more apical ones closely grouped 14
    Anepisternal bristles present; mid tibia with normal, sparse bristles or spines anteriorly 15
14. Wing with posterior fork well distal to level of median fork .... **13. Exechia snyderi**
    Wing with posterior fork proximal to level of median fork .... **14. Allodia sabroskyi**

15. Pteropleural bristles absent; wing with posterior fork far distal to level of median fork...**15. Phronia boninensis**
Pteropleural bristles present; wing with posterior fork absent or distinctly proximal to level of anterior fork...16
16. Vein M3+4 (and posterior fork) absent; mesonotum with shiny, wedge-shaped boss at anterior margin...**18. Aspidionia palauensis**
Vein M3+4 present; mesonotum without such boss...17
17. Costa not produced past apex of R5; M1 not reaching margin; mid tibia with two ventral bristles...**17. Epicypta boninensis**
Costa produced a short distance past apex of R5; M1 reaching margin; mid tibia with 3 to 4 ventral bristles...**16. Epicypta palauensis**

Subfamily Keroplatinae

Crossvein m-cu present; R4 short, less than half as long as R5, or absent; r-m replaced by a short fusion of Rs and M1+2. Posterior pronotum without long bristles.

Only the genera *Keroplatus* and *Orfelia* are known so far from Micronesia.

Genus **Keroplatus** Bosc

Keroplatus Bosc, 1792, Soc. Hist. Nat. Paris, Acta **1**: 42.—Freeman, 1951, Diptera of Patagonia and South Chile **3**: 19 (spelling).

Ceroplatus Edwards, 1929, Linn. Soc. New South Wales, Proc. **54**: 173 (subgenera).—Fisher, 1941, Am. Ent. Soc., Trans. **67**: 285 (full synonymy). Type species: *K. tipuloidea* Bosc.

Antennae stout, flattened, 16-segmented; mouth parts not elongate; palpi reduced, apparently consisting of a single porrect segment. Fore tibia without depressed sensory area anteriorly, adjacent to spur (in subgenera *Mallochinus* and *Heteropterna* at least). Anal area of wing with sparse macrotrichia (at least in *Cerotelion*, *Mallochinus* and *Heteropterna*).

I am here following the generic concept of Edwards (1929) and Fisher (1941), to include *Heteropterna* as a subgenus. Various authors, such as Edwards (1940b), treat the latter as a full genus, largely on the structure of the postnotum. However, a similar structure is found in some species of subgenus *Keroplatus* (Fisher, 1941) and in all species of subgenus *Mallochinus*. Okada (1938, p. 17) places *Heteropterna* under *Cerotelion*, a course with which I cannot agree.

Subgenus **Heteropterna** Skuse

Heteropterna Skuse, 1888, Linn. Soc. New South Wales, Proc. **3**: 166.—Edwards, 1929, Linn. Soc. New South Wales, Proc. **54**: 174.

Type species: *Heteropterna macleayi* Skuse.

Face narrow. Wing with R4 ending in costa. Tibiae with setulae arranged irregularly, and without posterior spines; hind tibia rather abruptly swollen on apical third; hind

metatarsus also swollen, with two very regular, ventral rows of small spines; tibial spurs yellow. The structure of the tarsal claws and male terminalia (see below) are also diagnostic for at least the Australian and Micronesian species.

A species from Palau Islands belongs to a group otherwise comprising the Oriental species (or subspecies) *K. nigrescens* and *K. quadripunctatus* and the Japanese *K. septemtrionalis*. It differs from these, *inter alia*, in ornamentation of abdomen, antenna, and legs.

1. Keroplatus (Heteropterna) annulipes Colless, n. sp. (fig. 1, *a–c*).

Male. *Head* dark brown behind and on vertex; face pale brown; mouth parts a little darker. Antennae very short and broad, the segments dorsally produced, mostly dark brown, but segments 9 and 10 with pale-yellow dorsal processes and segments 13 to 15 all yellow; segment 16 dark.

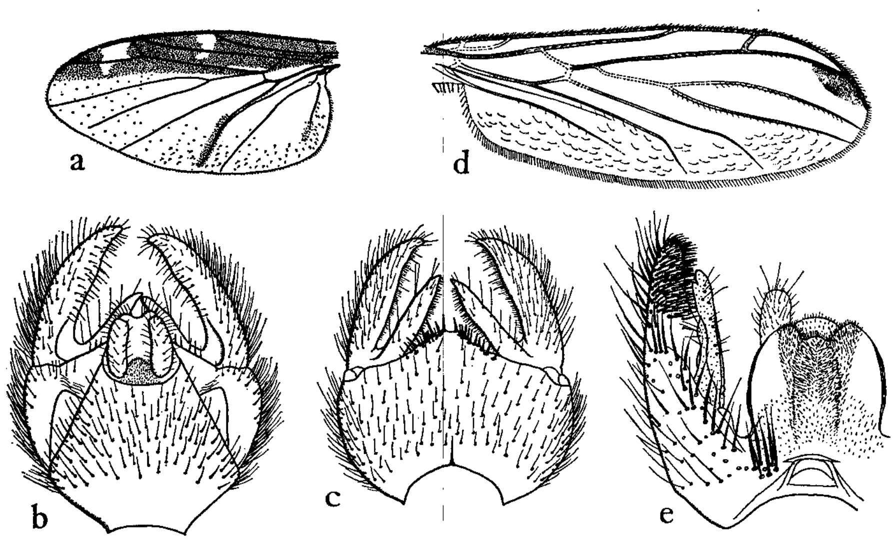


FIGURE 1.—**a–c**, *Keroplatus annulipes: a*, wing; *b*, male terminalia, dorsal view; *c*, same, ventral view. **d**, **e**, *Orfelia spinosa: d*, wing; *e*, male terminalia, ventral view.

Thorax: Mesonotum uniformly covered with fine setulae, brown, with 2 broad, sublateral, pale yellowish stripes, extending from near anterior margin right back to scutellum; also, between these stripes, another similar pair that reach margin anteriorly and coalesce posteriorly; also, a pale depression above each wing, and small, pale areas at anterolateral angles, extending across onto posterior pronotum. Scutellum dark brown, with marginal fringe of fine hairs. Postnotum pale brown. Halteres with pale stem and dark brown knob. Propleuron dark brown, hairy; prosternum pale, with sparse, short setae; anepisternite mostly dark brown, with patch of dense, short, dark setae; remainder of pleura mostly rather pale brown, with a pale longitudinal band crossing sternopleuron and a dark band dorsal to pale band.

Legs: Coxae dark brown, narrowly pale at their bases; remainder of legs mainly dark brown, except for tibial spurs and rather broad, pale bands across junctions of tarsal segments; tarsal segment 5 mainly pale. Claws large and blunt, broad and finely pectinate on apical two-thirds, with a spinose swelling on basal third. Fore legs very weakly developed,

tarsi very slender, almost flagellum-like. Hind metatarsus about half as long as tibia, and about as broad as tibia just distal to its center.

Wing: (fig. 1, *a*) length 3.4–3.8 mm.; lightly infuscated, slightly darker on apical fourth and much darker anterior to vein Rs and in anterior half of cell R5; dark anterior area broken by central and subapical pale areas that include costa; also, a linear dark patch along Cu1 and a small patch at apex of 2A. M2 ending a little short of wing margin. Cu1 with short row of setulae distal to m-cu. Anal lobe with scattered macrotrichia on a submarginal band extending into cell M4.

Abdomen: Dorsal pattern rather indistinct; segments 2 to 5 mainly pale yellowish with posterolateral dark patches which increase in size on more posterior segments; segment 6 with pale basal band or laterobasal patches; segment 7 and terminalia dark brown. Venter with prominent pattern, segments 2 to 6 each with subapical pair of rounded, pale spots; segments 3 to 5 also with similar laterobasal spots and segment 6 with a pale, basal band.

Terminalia (fig. 1, *b*, *c*): coxites fused with sternite 9, the median area produced and bearing strong, black spines; styles bifid. Tergite 9 large, strongly tapering both anteriorly and posteriorly.

Holotype, male (BISHOP 5974), Koror I., Palau Is., Mar. 19, 1954, Beardsley. One paratype, male, same data as for holotype.

DISTRIBUTION: Caroline Is. (Palau).

Genus **Orfelia** A. Costa

Zelmira Meigen, 1800, Nouv. Class., 16.—Various authors (rejected).

Orfelia A. Costa, 1857, I Giambattista Vico, Giornale Scientifico, Naples **2** : 448.—Hardy, 1960, Insects of Hawaii **10** : 199.

Platyura of most authors, but not of Meigen, 1803, Illig. Mag. fur Insekten. **2** : 264.

Type species: *Platyura fasciata* Meigen.

Antennae 16-segmented, not greatly flattened or otherwise modified. Mouth parts normal, not elongate; palp with 3 to 4 normal segments. Wing without any trace of basal portion of vein M. Tarsi, and usually tibiae, with small spines; hind tibia with anterior and posterior apical combs, and at least one spur; fore tibia usually with depressed sensory area adjacent to spur.

Edwards (1929) and subsequent authors describe the genus as lacking macrotrichia on the wing. It has apparently been overlooked that at least a few macrotrichia are present in the anal area in many subgenera of *Orfelia*; also in the genera *Keroplatus*, *Asindulum*, and *Antlemon* (Freeman, personal communication).

The correct name for the genus has been in doubt for some time, owing to the controversy concerning the "Meigen 1800" names, and to earlier misapplication of the name *Platyura*. Hardy (1960) gives a summary of the situation, and I am following his synonymy.

The genus (as *Platyura*) was divided by Edwards (1929) into a number of subgenera. These have won general acceptance, and several new ones have been added (Edwards, 1931, 1941; Hardy, 1960). The eight Micronesian species fall in *Neoplatyura* (four species), *Xenoplatyura*, *Rutylapa*, and *Laurypta* (one species each), while one species probably requires a new subgenus.

Subgenus **Neoplatyura** Malloch

Neoplatyura Malloch, 1928, Linn. Soc. New South Wales, Proc. **53**: 601 (as new genus)

Type species: *Platyura setiger* Johannsen.

Fine setulae present along veins M1 and M2, and usually along M3+4 and Cu1 also. Pleura with a row of tiny setae behind anterior spiracle. Tibial setulae arranged in rows; mid and hind tibiae each with two distinct spurs. Male terminalia with strongly sclerotized, elongate aedeagus, of complex structure, with strong apodemes projecting back into eighth segment. In addition, males, and often females also, have from a few to many erect macrotrichia posteriorly on wing.

Edwards (1929) showed that several species groups can be recognized on characters of the male terminalia, although I am aware of an Australian species which seems to be intermediate in this regard. The four Micronesian species fall in the group represented by the Australian *O. fidelis* Edwards, in which tergite 9 is not developed and the coxite has a long, rather fingerlike, apical lobe, and the style placed subbasally. Sternite 9, although weakly sclerotized, is well developed, with a median and two lateral lobes, the former often carinate, particularly in dried specimens. These lobes are best displayed in slightly flattened preparations.

The Micronesian species are obviously closely related and some may eventually prove to be only subspecifically distinct. All closely resemble the Oriental *O. tjibodensis* Edwards, which was described from a female, but for the present, I propose to describe all four as new.

2. **Orfelia (Neoplatyura) spinosa** Colless, n. sp. (fig. 1, *d*, *e*).

Male. *Head:* Vertex, frons, face and mouth parts all pale to mid brown, except for an oval black spot around ocelli; the latter three in number, placed close together. Face with sparse, very short, black hairs. Antenna brown, in some specimens distinctly darker on about apical half; segments 5 to 15 little, if at all, longer than wide; segment 16 about twice as long as wide, with a terminal papilla. Palp 4-segmented; segment 2 globular, with at least one sensory pit (cleared specimens may reveal two sense organs, as in the Australian *O. fidelis*): segment 4 about twice as long as segment 3.

Thorax: Mesonotum pale to medium brown, with black setae, these short and fine on central area, longer and stronger laterally and in the prescutellar region; setae absent from a pair of submedian, poorly defined, bare lines on anterior two-thirds of disc and, lateral to these, another similar pair of lines on posterior two-thirds. Pleura brown, rather paler than mesonotum, without setae except on propleuron and behind spiracle. Scutellum brown, with marginal fringe of black setae; halteres with brown knob, paler stem.

Legs: Coxae pale brown, other segments increasingly darker. Tibiae with linear arrangement of setulae most conspicuous toward apices, all rows more or less alike; mid and hind tibiae with small spines on anterior, dorsal, and posterior surfaces; hind tibia also with a conspicuous, regular row of about 15 short, but strong, blunt spines on about central half of anterior surface. Tibial spurs black; anterior spur rather less than half as long as posterior on mid tibia, rather more than half as long on hind tibia; hind tibia with dark anterior and posterior apical combs; mid tibia with posterior comb only. Tarsal claws each with a long, fine, basal tooth.

Wing: As illustrated (fig. 1, *d*); length 3.0 mm. Membrane very slightly brownish, with faint brown apical cloud, posterior to apex of R5; veins brown, but M1+2 and extreme

base of M3+4 paler and rather indistinct. Costa extending more than halfway from apex of R5 to apex of M1. Sc distinct, rather short, ending well before origin of Rs. Apex of R4 a little short of halfway between R1 and R5. M1+2 rather short, the fork a little proximal to or directly opposite, apex of R1. M1 and M2 converging apically. Apical part of M3+4 slightly, but rather abruptly, angled in a posterior direction; Cu1 similarly, but more strongly, angled; both veins ending a little short of wing margin. Fusion of Rs and M1+2 distinctly longer than base of M1+2. 1A longer than Cu2. Posterior portion of membrane with a broad band of erect, curved macrotrichia, from anal lobe to apex of M2. Cu1 and 1A with setulae on central part only, M3+4 without setulae.

Abdomen: Venter pale brown, dorsum darker, with poorly defined, paler bands on about the apical third of segments 2 to 6. Terminalia as illustrated (fig. 1, *e*); apical lobe of coxite relatively short and broad, reaching only a little past apex of style, apical half of its internal surface with massed, short strong, dark spines; base of coxite with very strong setae on ventral surface, forming a distinct cluster at internal angle. Median lobe of sternite 9 at most only slightly "keeled," about as long as lateral lobes. Aedeagus well sclerotized, of complex structure, with long basal apodemes.

Female. Generally similar to male. Hind tibiae without anterior row of blunt spines. Wing with very sparse and inconspicuous macrotrichia on membrane. Veins M3+4, Cu1, and 1A all with setulae along most of their lengths. M3+4 and Cu1 evenly, and much less strongly, curved on the apical portions. Terminalia retracted within segment 7.

Holotype, male (US 67946), Civ. Ad. Area, Moen (Wena), Truk, Mar. 1, 1949, Potts. Paratypes, one male and two females, same data as holotype, except Mar. 4, 21, Apr. 24, 1949; one female, Mt. Unibot, Ton I., Truk, Feb. 4, 1953, Gressitt. The specimen selected as holotype is rather paler than others in the series, possibly as a result of preservation.

DISTRIBUTION: E. Caroline Is. (Truk).

3. **Orfelia (Neoplatyura) palauensis** Colless, n. sp. (fig. 2, *e*).

Male. Closely resembles *O. spinosa*, differing as follows: 1, fork of M1+2 well distal to apex of R1; 2, Cu2 as long as, or longer than, 1A; 3, M3+4 somewhat sinuous on apical third; 4, macrotrichia on membrane extending into cell M1, and several in cell R4; 5, terminalia (fig. 2, *e*) with style of apparently different shape, coxite with ventral setae weaker and not forming a cluster at internal angle, apical lobe with coarse hairs rather than spines.

Female. As for male, in characters 1 and 2. In one specimen, fork of M1+2 only slightly distal to apex of R1.

Holotype, male (US 67947), Ngiwal, Babelthuap I., Palau Is., May 21, 1957, in jungle, Sabrosky. Paratypes: Melekeiok, Babelthuap I., Palau Is., May 23, 1957, Sabrosky; female, Ulimang, Babelthuap I., Dec. 9, 1947, Dybas.

DISTRIBUTION: Caroline Is. (Palau).

4. **Orfelia (Neoplatyura) petiolata** Colless, n. sp. (fig. 2, *a*, *b*).

Male. Closely resembles *O. spinosa*, differing as follows: General integument rather pale brown. *Thorax:* posterior three-fourths of mesonotum with a pair of large, dark-brown, oval patches laterally, their internal margins more or less following line of dorsocentral bristles; halteres uniformly pale brown.

Wing: (fig. 2, *a*) relatively longer and narrower, length 2.9 mm.; membrane clear, without apical clouding. M1+2 longer, fork well distal to apex of R1; fusion of Rs and M1+2 about equal to basal portion of M1+2. M3+4 with setulae on short length of basal half. Macrotrichia on membrane somewhat sparser, but extending into cell M1.

Abdomen: Terminalia (fig. 2, *b*) with apical lobe of coxite less robust, its internal surface with strong setae only; style broadly expanded; ventral setae of coxite strong and extending to internal angle, but not forming a cluster there.

Holotype, male (BISHOP 5975), Pt. Oca, NAMRU-2, Guam, light trap, June 2, 1945, Bohart and Gressitt.

DISTRIBUTION: S. Mariana Is. (Guam).

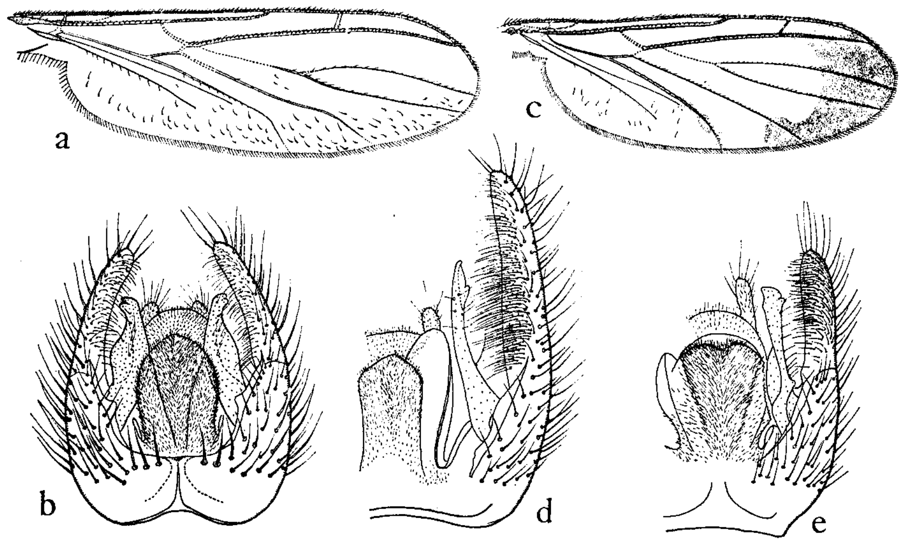


FIGURE 2.—**a**, **b**, *Orfelia petiolata: a*, wing; *b*, male terminalia, ventral view. **c**, **d**, *O. digitata: c*, wing; *d*, male terminalia, ventral view. **e**, *O. palauensis*, male terminalia, ventral view.

5. **Orfelia (Neoplatyura) digitata** Colless, n. sp. (fig. 2, *c*, *d*).

Male. Closely resembles *O. spinosa*, differing as follows: General integument darker; on head, the dark spot over ocelli is thus correspondingly less conspicuous. Palpal segment 4 rather shorter, about 1.5 times as long as segment 3.

Legs: Anterior spur on mid tibia relatively longer, about half as long as posterior spur. Claws of fore legs and mid legs each with 2 fine, basal teeth.

Wing (fig. 2, *c*): Length 3.4 mm. Sc slightly shorter. M1+2 relatively shorter, fork more distinctly proximal to apex of R1. M1 and M2 less strongly convergent. M3+4 and Cu1 both with setulae along most of their lengths; the former almost straight, the latter gently curved. Fusion of Rs and M1+2 about as long as basal portion of M1+2. Cu2 distinctly longer than 1A. Membrane very faintly clouded in cell R4 and posterior to vein R5; macrotrichia on posterior areas sparse and relatively inconspicuous, not extending anteriorly to Cu1.

Abdomen: Dorsum without obvious pale bands. Terminalia as illustrated (fig. 2, *d*). Coxite with very long, fingerlike, apical lobe, its internal surface with normal setae; ventral surface of coxite with weaker setae, not extending to the internal angle; style more slender.

Holotype, male (US 67948), Yoake Yama, Chichi Jima, Bonin Is.,

April 21, 1958, Snyder. Paratype, male, Omura, "Camp Beach," Chichi Jima, May 5–June 9, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima).

Subgenus **Xenoplatyura** Malloch

Xenoplatyura Malloch, 1928, Linn. Soc. New South Wales, Proc. **53**: 601 (as new genus).

Type species: *Platyura conformis* Skuse.

Mesonotum uniformly setulose. Wing with branches of M and Cu1 all devoid of setulae; 1A reaching margin. Tibial setulae in rows on at least apical third. Oriental and Australian species have several small setae on frons, above and between antenna bases; veins M3+4, Cu1, and usually M2, do not reach margin; and tibial setulae are irregularly arranged on about basal half of segment.

Lane (1950, p. 139) sinks subgenus *Truplaya* under *Xenoplatyura*, but I prefer to await more detailed examination of Oriental and African species before accepting this conclusion.

The single Micronesian species, from Truk, closely resembles other Oriental and Australian members of the subgenus; in fact, existing descriptions of the three Indian and one Samoan species are not sufficiently detailed, as regards structural characters, to indicate any clear-cut differences from the Truk species. However, I feel that the only course available is to describe it as new.

6. **Orfelia (Xenoplatyura) pottsi** Colless, n. sp. (fig. 3, *a–c*).

Male. *Head:* Vertex rather dark brown. Frons with 2 or 3 tiny setae, set on a slight prominence above antennae bases. Face rather protruding, apparently without setae. Antennae missing. Palpal segment 2 rather irregular in shape, swollen on anterior surface only; segment 3 a little longer than 2 and 4 a little longer than 3.

Thorax: Mesonotum brown, with traces of darker central and sublateral stripes; setae black, mostly short but rather strong, becoming much longer and stronger laterally above wing root. Pleura brown, with setae on propleuron only. Halteres brown.

Legs with setulae arranged in rows on rather more than apical half of fore and mid tibiae, and on about apical third of hind tibiae. Tibial spurs black; posterior spurs on mid and hind legs very long, about half as long as tibia itself; anterior spurs about one-third length of posterior.

Wing (fig. 3, *a*): Length 3.0 mm. Costa produced about halfway from R5 to M1. Sc ending a little past base of Rs; Sc2 at about one-third distance from humeral crossvein. R4 ending about one-third distance from R1 to R5. R-M fusion long, four times length of basal portion of M1+2 and two-thirds length of apical portion of M1+2. M2, M3+4, and Cu1 all obsolete apically. Apex of wing with rather faint brown clouding in a broad band, covering apical half of cell R4 and fading out posteriorly (probably variable; see below).

Abdomen brown, apparently with traces of pale apical banding on some segments. Terminalia as illustrated (fig. 3, *b, c*); coxite roughly triangular in lateral view, sigmoid in ventral view, with a strong spine rising from a lobe near base; style placed basally, with two strong, blunt spines at apex; dorsal to coxites, a pair of large, broad, claspette-like processes.

Female. Similar to male, except that two of the three specimens lack apical clouding of wing.

Holotype, male (US 67949), Civ. Ad. Area, Moen (Wena), Truk, Mar. 7, 1949, Potts. Paratypes: female, Moen, Truk, Jan. 6, 15, 1949, Ross; two females, same locality as holotype, Mar. 1, 21, 1949, Potts.

DISTRIBUTION: E. Caroline Is. (Truk).

All specimens seen were damaged to some extent; the wing illustrated is from one of the variant females and lacks the apical dark cloud. This character is presumably variable, since all specimens came from the same locality and were otherwise identical.

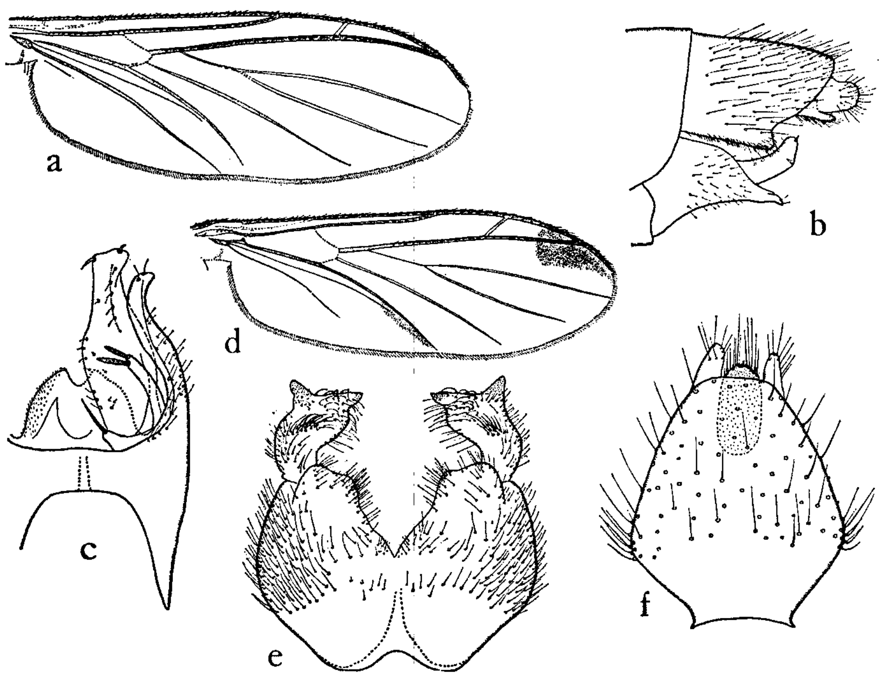


FIGURE 3.—**a–c**, *Orfelia pottsi: a,* wing (female variant); *b,* male terminalia, lateral view; *c,* same, ventral view. **d–f**, *O. gressitti: d,* wing; *e,* male coxites, ventral view; *f,* male ninth tergite and tenth segment, dorsal view.

Subgenus **Rutylapa** Edwards

Rutylapa Edwards, 1929, Linn. Soc. New South Wales, Proc. **54**: 171.

Type species: *Platyura ruficornis* Zetterstedt.

Wing without setulae on branches of M and Cu; costa produced well past apex of R5; 1A not reaching margin. Tibial setulae in regular rows; anterior spur of mid and hind tibiae present, but minute. Mesonotum uniformly setulose; spiracular bristles present.

A species from Yap agrees well with Edwards' definition of the subgenus, except that several minute setae are present, in front of the anterior spiracle. In his key this would place it in *Taulyrpa,* from which it differs in a number of apparently important features. I am not inclined to attach much importance to the presence of anterior spiracular hairs; for example, Lane (1950, p. 32) describes a typical *Taulyrpa* which lacks them. The latter author sinks *Rutylapa* under *Ralytupa,* but I am not prepared to follow this course until the terminalia of non-Neotropical species have been more thoroughly studied. It is clear that a number of these subgenera are in need of redefinition.

7. **Orfelia (Rutylapa) gressitti** Colless, n. sp. (fig. 3, *d–f*).

Male. *Head:* Vertex brown, except for usual dark area over ocelli. Face and mouth parts brown, the former with a patch of small, bristly setae. Palp segment 2 only slightly swollen, a little shorter than 3, segment 4 about 1.5 times as long as, and paler than 3. Antennae more or less uniformly brown; segments 4 to 15 about as long as wide; segment 15 with very distinct terminal papilla.

Thorax: Mesonotum uniformly setulose, brown, with a pair of rather faint, narrow, darker, dorsocentral lines. Scutellum brown. Postnotum pale brown, rather pointed, with a few tiny black bristles at apex. Halteres with pale stem and dark knob. Pleura mainly pale brown, but hypopleurite dark, and dark patches present behind prothoracic spiracle and base of fore coxa and anteriorly on pleurotergite.

Legs: Coxae pale yellow brown, femora a little darker, other segments rather dark brown. Tibial spurs black; anterior spurs on mid and hind leg minute but distinct; posterior spurs rather short, that on hind leg only 0.15 times length of tibia, that on mid leg only a little more than half as long as that on hind leg. Fore tibia with pale-brown anterior comb, but no associated depressed sensory area; mid tibia with a row of small spines over most of posterior surface and a few toward center of anterior surface; hind tibia with several similar spines on anterior and posterior surfaces, mainly subapical on latter. Tarsal claws with a single basal tooth.

Wing as illustrated (fig. 3, *d*); length 2.6 mm. Costa produced to a little past midway from R5 to M1. Sc terminating opposite origin of Rs; Sc2 present, subbasal. R-M fusion fairly long; R4 oblique, terminating a little short of midway between R1 and R5. Fork of M1+2 a little proximal to apex of R1, petiole only slightly weaker than branches of fork. M2 and M3+4 not reaching margin. Cu2 longer than An. Membrane with faint brown cloud around apex of R5.

Abdomen: Dark brown, some specimens with traces of pale basal banding. Terminalia as illustrated (fig. 3, *e, f*); coxites fused with sternite 9, styles placed apically, hairy, with a pair of blunt, lateroapical teeth; tergite 9 tapering on apical two-thirds; sternite 10 prominent, ovoid, deeply pigmented; aedeagus largely membranous, without prominent apodemes.

Female. Similar to male.

Holotype, male (US 67950), Kolonia, Yap I., Yap, June 21, 1957, Sabrosky. Paratypes: Male, Rumung I., Yap, June 19, 1957; Sabrosky; female, Mt. Mataade, Yap I., 50 m., Dec. 2, 1952, Gressitt; one, sex unknown, near Yaptown, Yap I., 60 m., light trap, Nov. 29, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Yap).

Subgenus **Laurypta** Edwards

Laurypta Edwards, 1929, Linn. Soc. New South Wales, Proc. **54**: 171.

Type species: *Platyura leptura* Edwards.

Small, rather delicate species. Wing without setulae on branches of M and Cu; 1A and anal lobe absent. Postnotum with bristles. Tibial setulae in regular rows; each tibia with a single spur; fore tibia with small anterior comb, but no obvious associated sensory area.

I have a single damaged specimen from the Palau Islands. The abdomen and most of the legs are missing, but it clearly belongs in this subgenus, resembling the Oriental *O. leptura* and *O. tripunctata*. The ornamentation of thorax and wing is quite distinctive and, despite the condition of the specimen, I feel justified in describing the species as new.

8. Orfelia (Laurypta) apicalis Colless, n. sp. (fig. 4, *f*).

Head: Vertex medium brown; face, antennal flagellum, and mouth parts all very dark brown; antennal segments 1 and 2 paler. Palpal segments 2 and 3 about equal in length, rather broad, about as long as wide; segment 4 about twice as long as 3.

Thorax: Mesonotum pale brown, more or less uniformly setose, with a pair of dark marks on posterior quarter; the marks hooklike, resembling a "J" and its mirror image. Scutellum dark brown, contrasting sharply with mesonotal coloration. Pleura pale brown, darker on pleurotergite, without setae. Postnotum dark brown above, continuous with darkened pleurotergite; pale behind, colors sharply demarcated; dark area with a number of coarse, spiny setae. Halteres with dark brown knob, very pale stem. Coxae pale brown; fore femur pale brown, tibia and tarsus brown, and tibial setulae in rows throughout; other legs missing from specimen.

Wing (fig. 4, *f*): Length only 2.3 mm. Membrane with light clouding across apical portion, filling most of cell R4 and extending posteriorly to include apex of vein M3+4; a small faint cloud also over apex of Cu1. Sc short, ending about halfway from humeral crossvein to base of Rs. R4 very short and its cell narrow, the vein ending more than halfway from R1 to R5. Costa produced about three-fourths distance from R5 to M1. Fork of M1+2 a little distal to apex of R1; R-M fusion long, more than half as long as main stem of M1+2. 1A absent and anal lobe not developed.

Abdomen missing from specimen.

Holotype, sex unknown (US 67951), Ngiwal, Babelthuap I., Palau Is., May 21, 1957, in jungle, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

Subgenus undetermined

A very small, dark species from the Palau Islands is represented by two specimens, one in very poor condition and the other with some details obscured. Edwards' key (1929) gives no satisfactory subgeneric identification, owing, I think, to a defect in his couplet 13. Lane's key (1950) places the species in *Micrapemon*. There may be some relationship to this Neotropical subgenus, but there are also marked differences, such as possession of anterior tibial spurs and R4 ending in the costa. The species, when better known, will probably require a new subgenus.

9. Orfelia micella Colless, n. sp. (fig. 4, *a–e*).

Male. A very small, dark species.

Head: Vertex dark brown; ocelli placed almost in line, anterior one very small; a few minute setae on frons immediately above antennae bases. Face dark brown, rather broad, with tiny setae. Mouth parts pale yellowish brown, except for palp segment 2 which is dark brown. Palp as illustrated (fig. 4, *b*); segment 2 truncate, almost square-tipped, with a depressed sensory area, apical margin with tiny, dark, blunt spines; segment 3 arising subapically from segment 2; entire palp relatively long, about 0.75 length of antenna and 1.5 times length of anterior surface of head. Antenna (fig. 4, *c, d*) yellowish on segment 2, otherwise dark brown; segments 3 to 15 broader than long and asymmetrical, produced ventrally.

Thorax: Entire integument and setae very dark, almost black. Mesonotal details indistinct, but possibly with bare stripes. Scutellum sharply demarcated. Postnotum flattened dorsally, apparently bare. Halteres pale. Pleurotergites prominent, bare; anepisternite with fine, inconspicuous setae on dorsal half; propleuron with several bristles very strong.

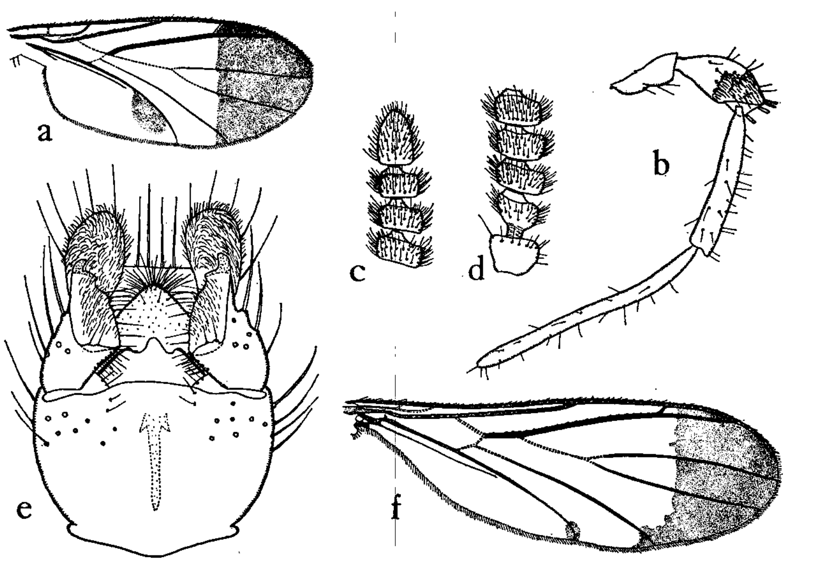


FIGURE 4.—**a–e**, *Orfelia micella: a*, wing; *b*, palp; *c*, antenna, segments 13 to 15; *d*, same, segments 2 to 6; *e*, male terminalia, ventral view. **f**, *O. apicalis*, wing.

Legs: Coxae and femora very dark, tibiae and tarsi paler, the latter only slightly so. Tibial setulae all in rows; spurs black, posterior spurs on mid and hind legs both one-fourth length of tibia; anterior spur of mid leg one-fourth and of hind leg one-third length of posterior spur. Fore tibia with small apical comb but no obvious sensory area; apical fourth to third of mid and hind legs with a few tiny spines on anterior and posterior surfaces, mainly on the latter. Tarsal claws minute, with long, fine basal tooth on claw of fore leg at least.

Wing as illustrated (fig. 4, *a*), relatively short and broad; length 1.7 mm.; faintly darkened on apical third, including all cell R4, and with similar cloud behind apical portion of Cu1. Only costa and radial veins darkened. Costa produced over about two-thirds distance from R5 to M1. Sc relatively long, ending well past base of Rs; Sc2 present. R4 oblique, ending a little past midway between R1 and R5. R-M fusion very short but

strong; M1+2 and bases of M1, M2 and M3+4 all very faint; M1 and M2 divergent; fork distal to apex of R1. 1A rudimentary; all other veins reaching margin.

Abdomen dark brown. Terminalia as illustrated (fig. 4, *e*), very small; partly rotated; coxites fused with sternite 9; styles placed apically, each with blunt apical and subapical teeth; sternite 10 transparent but prominent, conical, with numerous fine hairs radiating from its apex; aedeagus largely membranous.

Holotype, male (US 67952), Ulebsehel I., Palau Is., April 24, 1957, on beach, Sabrosky. Paratype, male, Imeliik, Netkeng, Babelthuap I., Palau Is., June 5, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

SUBFAMILY SCIOPHILINAE

Eyes separate; ocelli usually remote from eye margins; orbital bristles usually not forming a conspicuous row; wing often with macrotrichia; microtrichia not arranged in definite lines; Sc usually long; m-cu absent; Rs arising at one-third or more wing length from base; R4 often present, ending in R1.

Only the genera *Neoempheria* and *Leia* have so far been found in Micronesia.

Genus **Neoempheria** Osten-Sacken

Empheria Winnertz, 1863, Zool.-bot. Ges. Wien, Verhandl. **13**: 783 (preoccupied).

Neoempheria Osten-Sacken, 1878, Smithsonian Misc. Coll. **16**(2): 9.—Edwards, 1940, Nov. Zool. **42**: 107 (full synonymy).

Type species: *Sciophila striata* Meigen.

Wing patterned; R4 ending in R1; costa produced past apex of R5; a *vena spuria* present between R5 and M1. Ocelli two in number, placed together near center of head. Tibial setulae arranged in rows. Male terminalia complex, as described by Edwards (1940a).

A species from the Bonin Islands belongs to the group otherwise comprising *N. striata* (Palaearctic), *N. ferruginea* (India, Japan), *N. propinqua* (Malaysia), and an undescribed Australian species. These all have cell R4 very long, Sc surpassing the origin of Rs, and five stripes on the mesonotum. Male terminalia have not been described for other members of the group and would, no doubt, reveal good specific characters; "*N. ferruginea*" of Japan (Okada, 1938, p. 136) may, in fact, prove to be a distinct species. The Micronesian species differs from the others, *inter alia*, in its dark halteres and indistinct mesonotal pattern.

10. Neoempheria vicina Colless, n. sp. (fig. 5, *a–d*).

Male. *Head* pale brown above, darker laterally and posteriorly and above antenna bases; ocelli surrounded by a black spot, with a faint dark line extending posteriorly from it; bristles behind ocelli only a little longer than width of ocellar spot. Eyes very slightly

emarginate above antenna bases. Antenna: segments 1 and 2 pale brown ventrally, flagellum dark brown; segments 4 to 16 about as long as broad; segment 1 with a curious, small, papilla-like process ventrally on its apex. Face and labella pale brown, minutely pubescent, the former with a transverse clypeal suture. Palps very dark brown (as usual in this genus); segment 2 slightly swollen and a little shorter than 3; segment 4 about 1.5 times as long as 3.

Thorax: Pronotum pale yellow, except for small dark area at internal angle of posterior section. Mesonotum pale yellowish laterally, most of the disc rather dark brown with 5 faintly indicated, darker, longitudinal stripes following sublateral, dorsocentral, and acrostichal bristles; setae rather short and fine on most of the disc but longer and stronger laterally and toward posterior margin. Scutellum brown, with 3 to 4 strong marginal bristles and small setae on disc. Postnotum brown. Halteres with dark knob and pale stem. Pleura mainly pale yellowish, translucent, but pleurotergite darker, of same color as postnotum; sclerites bare, except for a single seta dorsal to base of each haltere.

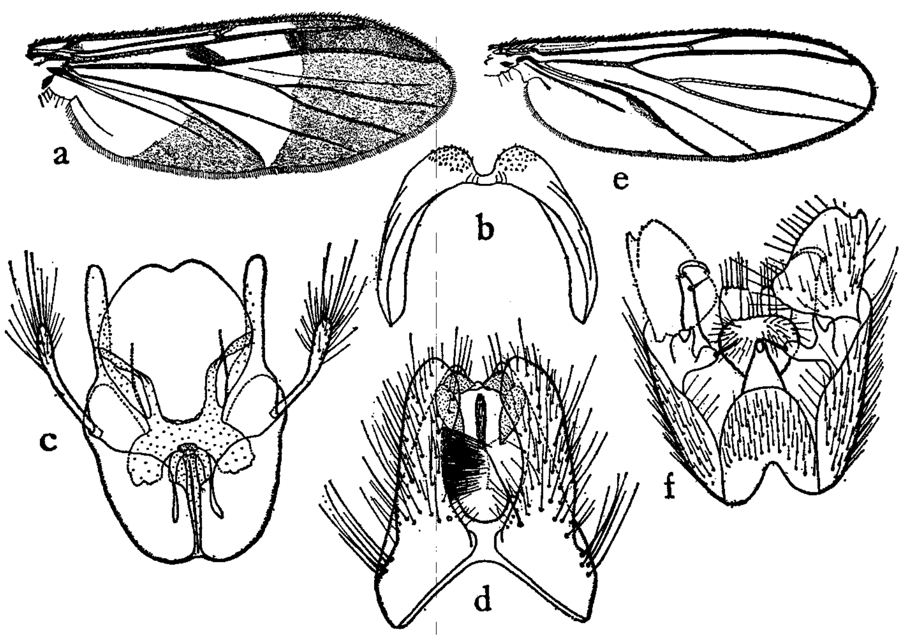


FIGURE 5.—**a–d**, *Neoempheria vicina:* *a*, wing; *b*, male eighth sternite, dorsal view; *c*, male coxites and aedeagus, ventral view; *d*, male ninth tergite and tenth segment. **e**, *Leia ridens*, wing. **f**, *Manota hamulata*, male terminalia, ventral view.

Legs: Mid and hind coxae pale yellowish, fore coxae darker, brownish; other segments increasingly darker, tarsi dark brown. Tibial spurs dark brown, subequal in length on mid and hind legs; fore tibia with a sensory area near base of spur; mid tibia with anterior and posterior rows of about 7 small, black spines, shorter posterodorsal and anteroventral rows of similar spines, and a posteroventral row of smaller spines; hind tibia with prominent anterior row of about 10 rather strong spines, a sparser posterodorsal row of similar spines, and a few finer spines posteroventrally and posteriorly. Tarsal claws minutely serrate on their basal halves.

Wing (fig. 5, *a*): Length 4.0 mm.; patterned, with dark spots over R4 and base of Rs, and an extensive, paler brown area over apical third of wing and behind Cu1. Costa produced only a little way past R5. Sc reaching almost to center of cell R1, setulose on about apical

fourth; Sc2 transverse, subapical on Sc. R4 oblique, arising well past level of median fork; cell R1 about 5 times as long as broad. Cu2 distinct, longer than 1A; M1, apical half of M2, M3+4, and Cu1 all setulose.

Abdomen: Dorsum mainly dark brown, but segments 1 to 6 all with large, yellowish, laterobasal patches; the more posterior segments pale brown. Venter all pale brown. Terminalia (fig. 5, *b–d*) partially rotated; segment 7 with only the sternite involved in the rotation; segment 8 and sternite 9 telescoped within segment 7, pale and weakly sclerotized; sternite 8 (fig. 5, *b*) narrow, strongly emarginate, bare; tergite 9 (fig. 5, *d*) with two long hairy lobes, each with a central patch of internally directed, dark, spiny bristles; each lobe also with another small lobe ventrally near its base. Segment 10 with a pair of small cerci and, between them, a finely haired ridge; sternite with two small, hairy apical lobes and, ventrally, a large membranous expansion, terminating in a pair of blunt, fingerlike lobes. Coxites (fig. 5, *c*) small, each with a hairy, clublike, subapical style, and a long, fingerlike, membranous apical process (? inner style of Edwards, 1940). Aedeagus largely membranous, globular, with four apical lobes, supported by a strong chitinous armature, as in figure 5, *c*.

Female. Similar to male; some specimens with mesonotal stripes a little more distinct. Tarsal claws each with a single, central tooth.

Holotype, male (US 67953) and allotype, female (US), Okimura, Haha Jima, Bonin Is., April 26–May 9, 1958, Snyder. Paratypes, two females, same data as holotype; female, Sen-zan, Anijima, Chichi Jima, Bonin Is., May 28, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima, Haha Jima).

Genus **Leia** Meigen

Leia Meigen (part), 1818, Syst. Beschr. **1**: 258.—Johannsen, 1909, Genera Insectorum **93**: 76 (full synonymy).—Edwards, 1924, Ent. Soc. London, Trans., 577.

Type species: *L. fascipennis* Meigen.

Wing with crossvein r-m longitudinal, about as long as, or longer than, apical portion of R1; Sc ending in costa (though sometimes faint apically); costa not produced past apex of R5; M1 and M2 complete at base. Ocelli 3 in number, lateral ones touching, or very nearly touching, eye margins. Pleurotergites bulging and hairy. Tibial bristles strong.

A species from Bonin Islands seems rather closely related to *L. flavolimbata* (India), *L. annulicornia* (India, Malaysia), *L. maculicoxa* (Seychelles, Ceylon) and perhaps *L. rubrithorax* (Japan). From all of these, it differs clearly in features of ornamentation, and, despite the lack of males, I have no hesitation in describing it as new. Like the above species, it belongs in Edwards' subgenus *Rhymoleia* (1924b), but I am reluctant to use the subgeneric category in a formal fashion until the genus has been studied on a worldwide basis.

11. **Leia ridens** Colless, n. sp. (fig. 5, *e*).

Female. *Head* dark brown above, to a level a little below ocelli, slightly darker around lateral ocelli, pale brown on a band above antenna bases. Lateral ocelli touching eye margins, the internal ocellar bristles only moderately strong. Face pale yellowish, broad, flattened, with tiny dark setae and the usual strong suture dorsally. Labella pale brown, with fringe

of short, but rather stout, rodlike setae. Palp segments 1 and 2 dark brown, segments 3 and 4 pale yellow; length of segments 1 to 4 approximately in ratio 1:2:4:5. Antenna: segments 1 and 2 pale yellow; segments 3 to 7 pale with dark apical bands; the bands produced basally on dorsal surfaces and of increasing widths on more apical segments; remaining segments dark brown with indistinct pale basal areas on internal and external surfaces; flagellar segments of decreasing lengths, segment 3 twice as long as broad, segment 15 as long as broad.

Thorax: Pronotum yellow brown. Mesonotum mainly dark brown, pale across anterior margin and laterally on broad, wedge-shaped areas extending back to wing roots; setae brown; prescutellar dorsocentrals well developed, but weaker than corresponding lateral bristles. Scutellum pale brown, with a single pair of strong subapical bristles; lateral to these, a few short, fine setae. Postnotum dark brown. Halteres yellow. Pleura mainly pale brown anteriorly, somewhat darker on sternopleurite; pteropleurite and pleurotergite dark brown.

Legs: Coxae and femora pale yellow brown; hind femur with well-defined dark area surrounding apical one-sixth of segment. Tibiae and tarsi rather pale brown; mid and hind tibiae narrowly darkened at apices. Tibial spurs and spines dark brown. Tarsi with large, padlike empodium and minute claws.

Wing as illustrated (fig. 5, *e*), with rather yellowish tinge; length 3.5 mm. Sc very faint apically; Sc2 barely discernible. M1 and M2 very fine, almost obsolescent apically.

Abdomen mainly dark brown dorsally; segment 1 with narrow, yellow basal band; segments 2 to 6 with yellow, triangular, laterobasal patches, those on segment 3 much smaller than on other segments. Venter mainly yellow brown, but segments 2 to 6 with oblique, dark-brown bands, running from near posterior angles toward center of basal margin. Segments 7 to 10 all telescoped inside segment 6, pale yellowish, except for darkened apices of cerci.

Holotype, female (US 67954), Okimura, Haha Jima, Bonin Is., April 26–May 9, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Haha Jima).

SUBFAMILY MANOTINAE

Includes the single genus *Manota* (see below). I am, for the present, following Edwards (1938) and Hennig (1955) in excluding *Allactoneura* and *Eumanota* from the subfamily, pending the discovery of a definition which will allow them to be included.

Genus **Manota** Williston

Manota Williston, 1896, Ent. Soc. London, Trans., 260.—Edwards, 1925, Ent. Soc. London, Trans., 505; 1924, ibid, 544.

Cerato Meunier, 1904, Mon. Mycetoph., 76.

Aphanizophleps Enderlein, 1911, Stett. ent. Zeitung **72**: 201.

Type species: *M. defecta* Williston.

Head flattened behind, more or less circular in anterior view, with a row of strong, projecting, slightly recurved, orbital bristles; antennae inserted above middle of head; palp very long, segment 3 inserted subapically on segment 2. Wing with base of vein M missing, M1 and M2 forming free branches at margin; M3+4 originating near base of wing; microtrichia arranged in fairly regular lines. Tibiae with weak bristles and setulae

arranged in rows. (The long vein M3+4 occurs also in *Allactoneura* and *Eumanota*, and may eventually support their inclusion in the subfamily.)

A species from the Palau Islands belongs to a group of very similar Oriental and Pacific species (see Edwards, 1928) and most closely resembles the Samoan *M. pacifica*.

12. **Manota hamulata** Colless, n. sp. (fig. 5, *f*).

Male. Apparently very similar to *M. pacifica* Edwards, differing principally in details of terminalia.

Head: Vertex dark brown; remainder, including mouth parts and setae, all pale yellowish. Antennae pale brown, with profuse, short pubescence, which is about half as long as the segments are wide.

Thorax: Mesonotum olive brown, with fine, pale setulae. Scutellum similar, with a pair of rather strong apical bristles, each with a smaller bristle slightly external to it. Pleura dull, pale brown.

Legs: Coxae and femora yellow; remainder of legs distinctly darker.

Wing: Length 1.8 mm.; clear. Costa ending a little short of apex of M1. R1 short, ending well before center of wing. Rs running more or less parallel, and very close to, costa. M2 a little more than twice as long as M1. Cu1 not quite joining M3+4, the long, basal piece apparently belonging to the latter vein.

Abdomen pale olive brown, with pale setulae. Terminalia as illustrated (fig. 5, *f*); differs from *M. pacifica* in lacking internal spine near apical margin of style; also, apical process of claspette more strongly hooked and subapical spine present. Coxite with peculiar, subapical lobe, bearing an apical spine; this structure not comparable with any ventral process shown in Edwards' (1928) figures.

Holotype, male (US 67955), Angaur I., Palau Is., Feb. 4, 1948, Dybas. Paratypes: Male, Melekeiok, Babelthuap I., Palau Is., May 23, 1957, Sabrosky; male, Malakal I., Palau Is., May 2, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

Subfamily MYCETOPHILINAE

Eyes separate; lateral ocelli touching eye margins, median ocellus very small or absent; orbital bristles not forming a conspicuous row. Wing without conspicuous macrotrichia, microtrichia arranged in fairly definite lines, particularly near wing margin; Sc reduced, never reaching costa; R4 absent. Tibial setulae almost always arranged in regular rows.

The genera *Exechia*, *Allodia*, *Phronia*, and *Epicypta* occur in Micronesia, as well as *Aspidionia*, a genus here described as new.

Genus **Exechia** Winnertz

Exechia Winnertz, 1863, Zool.-bot. Ges. Wien, Verhandl. **13** : 879.—Johannsen, Genera Insectorum **93** : 106 (synonymy).

Type species: *E. fungorum* Degeer.

Anepisternal and pteropleural bristles absent. Wing with costa not produced past apex of R5; posterior fork placed well distal to level of median fork; 1A often weak or absent, but 2A well developed.

A species from Bonin Islands belongs to a group that, according to Edwards (1928), has a wide distribution in the Old World tropics, from Africa to Samoa. The peculiar sense organs on the legs (see below) are found also in several Australian species, and in, at least, *E. lutacea* (Samoa) and *E. mastigura* (Malaya). The Micronesian species resembles *E. mastigura*, but differs in ornamentation and venation.

13. Exechia snyderi Colless, n. sp. (fig. 6, *b*).

Female. *Head:* Dark brown above, with narrow, yellowish area above each eye and antenna base. Median ocellus absent. Face yellow brown on dorsal half, except for narrow brown line above suture; dark gray ventral to suture. Palps pale brown. Antennae: Segments 1 and 2 pale brown; flagellum brown, darker on apical half; segments 4 to 14 all about as long as broad.

Thorax: Mesonotum medium brown, with a pair of broad, rather indistinct, darker stripes lying between dorsocentral and sublateral setae, commencing near anterior border and confluent in prescutellar area, dark area continuing over much of scutellum; also with two yellowish lateral stripes, from a little in front of wing root, continuing back along margins of scutellum; scutellum also with yellowish median area at apex. Disc of mesonotum with bristles mainly rather short and fine; anterior margin with reclinate bristles near center and stronger, proclinate ones laterally; one strong supraalar bristle present and one very strong posterolateral. Scutellum with tiny, pale setae on disc, a pair of very strong apical bristles, and, anterior to each of the latter, a row of 2 to 3 small, dark setae. Postnotum pale brown, with a triangular dark mark beneath scutellum. Halteres yellowish. Pleura pale yellowish brown; pleurotergite with about 9 dark setae on posterior half, dorsal ones shorter and weaker than ventral, and tiny, pale setae on anterior half; hypopleurite with 2 dark setae. Anterior pronotum with 2 to 3 strong bristles, propleuron with 2.

Legs: Coxae pale yellow, more apical segments progressively darker, tarsi dark brown. Fore coxa with apical and posterior fringe of about 8 strong bristles; mid coxa with about 4 apical and subapical bristles; hind coxa with single apical, subapical, and subbasal bristles externally and one strong subapical bristle internally. Tibial spurs brown. Posterior surface of fore tibia with a narrow, trenchlike sense organ on apical half, its dorsal margin with a regular row of 25 to 30 short, erect, blunt spines; a similar but shallower organ present on adjacent basal two-thirds of metatarsus, bordered ventrally by tiny erect hairs and dorsally by a very regular row of about 35 small spines with fine recurved tips, the row continued apically by about 10 tiny blunt spines (these details visible only at high magnifications). Mid tibia with a row of short, rather fine, blunt spines on about the apical three-fourths of anterior surface; also, close to basal third of that row, a second, more dorsal row of about 10 similar, but larger, spines; posterior, posteroventral, and posterodorsal rows of normal, sharp spines also present. Posterior apex of hind tibia with ovoid sensory area of fine, decumbent, pale golden pubescence; adjacent to it, on basal one-fifth on metatarsus, a linear sense organ of similar type; tibia also with anterior row of 10, and posterodorsal row of 6, rather strong spines, and shorter posterior row of 6 smaller spines near apex of segment.

Wing (fig. 6, *b*) with slight yellowish tint anteriorly; length 3.3 mm. Costa with strong subbasal bristle. Sc short but strong, terminating abruptly. R completely broken opposite humeral crossvein. Rs with very short basal portion, remainder of vein almost straight. M1 noticeably sinuous; M1, M2, and M3+4 all apically obsolescent.

Abdomen laterally compressed, strongly tapered posteriorly. Dorsum rather pale brown with dark, decumbent setae. Ventrally, only segments 2 to 4 visible, these creamy in color with large, dark-brown, central patches.

Holotype, female (US 67956), Miyanohama, "Jack Wm.'s Beach," Chichi Jima, Bonin Is., April 15–21, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima).

Genus **Allodia** Winnertz

Allodia Winnertz, 1863, Zool.-bot. Ges. Wien, Verhandl. **13** : 826.
Brachycampta Winnertz, ibid., 833.

Anepisternal and pteropleural bristles absent. Wing with costa not produced past apex of vein R5; posterior fork placed proximal to level of median fork; vein 1A absent; vein Cu2 strong, but ending only a little past level of posterior fork.

A species very common in the Palau Islands belongs to *Allodia*, according to the usual diagnosis given above. However, in many features it is clearly and closely related to at least some species of *Exechia*: in tibial and tarsal spines and sense organs (see *E. snyderi* above); in the male terminalia (see figures in Lane, 1951, p. 237); and in the female terminalia (see figures in

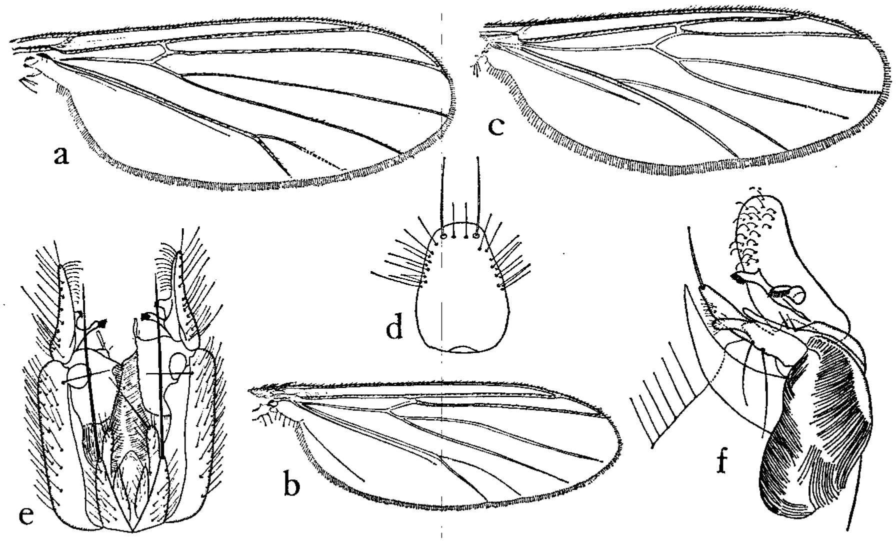


FIGURE 6.—**a**, ***Phronia boninensis***, wing. **b**, ***Exechia snyderi***, wing. **c–f**, ***Allodia sabroskyi:*** *c*, wing; *d*, male eighth sternite; *e*, male terminalia, ventral view; *f*, apex of male coxite, internal view.

Edwards, 1925). The resemblances in the male terminalia are particularly striking, and I am convinced that both these genera, and perhaps *Brachypeza* and *Rhymosia*, are at present quite artificially defined. It is hoped to deal with this problem in a future publication.

The Micronesian species is clearly related to *A. varicornis* White (Ceylon) and *A. micans* Edwards (Malaya), but differs in features of venation and mesonotal ornamentation.

14. Allodia sabroskyi Colless, n. sp. (fig. 6, *c–f*).

Male. *Head:* Vertex brown above, with strong, black, proclinate orbital bristles and short, dark-brown setulae, the latter absent from a narrow strip between orbital bristles and eye margins; anterior margin with 2 pairs of bristles directed laterally, the median pair strongly so. Face and mouth parts pale yellow, except for palp segment 2, which is dark brown; segment 3, and sometimes 4 also, brownish in some specimens. Antennal segments 1 and 2 pale yellowish; flagellum brown on basal 2 to 3 segments, grading to dark brown on more apical segments; segments 4 to 15 about as long as broad.

Thorax: Mesonotum with a broad, rather pale-brown, median stripe, bordered laterally by a pair of broad, dark-brown stripes, their internal margins a little lateral to the dorsocentral bristles; lateral to these, a pair of broad, pale-brown or yellowish stripes and usually a narrow, indistinct, darker line along lateral margins; the dark-brown stripes converge posteriorly but do not meet and, in some specimens, are very faint except near anterior margin. Some specimens (particularly those from Ngerehelong) with an additional, median, Y-shaped, dark mark between the two dark stripes. Anterior and lateral margins of mesonotum with quite strong, dark-brown bristles, dorsocentrals and sublaterals somewhat smaller but distinct, and the pair of postalars very strong. Scutellum from pale to dark brown, often with a paler median stripe, with setulae on disc and a single pair of strong apical bristles. Postnotum brown. Halteres pale yellow or, in some specimens (probably discolored), pale brown with basal half of knob reddish brown. Pronotum and pleura mainly pale yellow to pale brown, pleurotergite somewhat darker, anepisternite with a dark patch along anterior border. Propleuron indistinctly separated from pronotum, with 2 strong, dark bristles; pleurotergite usually with one long bristle and 4 to 8 shorter ones; posteroventral angle of hypopleuron with 2 small setae surrounded by minute setulae.

Legs: Coxae pale yellow to pale brown; femora and tibiae a little darker; tarsi dark brown. Hind coxa with subbasal and subapical bristles fairly strong, joined by a row of small setulae. Tibial spurs dark brown. Fore tibia with 2 to 3 small anterodorsal spines on apical third; also a posterior row of short but strong spines on apical two-thirds, these closely grouped near apex. Mid tibia with anterior row of small spines on apical three-fourths, the more apical ones broader, somewhat appressed, and very closely set; also with posterior and posteroventral rows of some 6 to 8 spines each and several larger posterodorsal spines. Hind tibia with anterior row of about 10 to 12 rather strong spines, a posterodorsal row of 6 to 7 smaller spines, and a short row of 3 to 4 spines posteriorly near apex; posterior comb distinct, with associated, presumably sensory, area of fine, appressed setulae; a similar, but elongate, sensory area present on adjacent base of metatarsus. Tarsal claws small, each with a fine basal tooth.

Wing (fig. 6, *c*) with slight brownish tint, strongest anteriorly; length 1.8–2.2 mm. Sc very short, terminating in, or very close to, R1, a little distal to h. Fork of M1+2 about level with origin of Rs; apices of M1 and M2 very faint, some specimens with M2 ending well short of margin. M3+4 originating well proximal to r-m. Cu2 strong, reaching well past posterior fork.

Abdomen: Tergites 1 to 5 pale yellow brown laterally, with dorsal dark patches of variable extent, subapical on segment 1, but extending from apex to, or almost to, bases of segments 2 to 5; the dark patches widened apically, and of increasing size on segments 2 to 5; that on segment 5 often covering entire apical margin; segment 6 similar, but dorsal dark patch at base of segment. Venter pale brown to pale yellow. The abdominal pattern is often obscured by a greasy discoloration. Terminalia (fig. 6, *d–f*) brown, prominent, the large coxites protruding from segment 6. Segment 7 with tergite narrow and with deep median notch anteriorly; sternite small, with a tuft of tiny bristles at each posterolateral angle, each tuft with one bristle much longer than others. Segment 8 with tergite very narrow and with several minute setae at each lateral margin; sternite as in figure 6, *d*. Coxites separate; styles with complex array of processes internally at base (fig. 6, *f*), one process long, pointed, bladelike, and another capsulelike and fringed; the apical lobes each with two small internal processes with comblike apices. Tergite 9 apparently represented by 2 elongate lobes, each with a very long apical bristle; a second pair of smaller, more internal lobes may also belong to this segment. Segment 10 with elongate cerci, each with a strong

apical bristle. Aedeagus forming a dorsally curved, laterally flattened, chitinous tube, which lies between ventral margins of coxites.

Female. Similar to male, but abdomen darker; dorsal dark patches covering all, or almost all, of apical margin on segment 4 and often on segment 3 also; segment 6 usually entirely dark dorsally, the posterior margin with a short, broad, triangular projection on each side, each projection covered by a more or less oval black spot. Cerci narrow, inconspicuous, shorter than triangular piece (? sternite 8) projecting beneath them.

Holotype, male (US 67957), allotype, female (US), Malakal I., Palau Is., May 2, 1957, Sabrosky. Paratypes, all from Palau Is.: 13 males, 21 females, data as for holotype; 6 males, 6 females, Ngerehelong, Babelthuap I., May 6, 1957, and male, 4 females, same locality, May 7, 1957; male, female, Ngaremlengui, Babelthuap I., June 2, 1957; male, female, Melekeiok, Babelthuap I., May 23, 1957, and two females, same locality, May 24, 1957; two males, female, Koror I., May 2, 1957, and female, same locality, April 28, 1957; all Sabrosky; male, Ngarmalk (N.W. Auluptagel), 25 m., Dec. 13, 1952, Gressitt.

The abundance of specimens from many localities suggests that this is the commonest mycetophilid in the Palau Islands. Specimens were taken along streams, in mangrove, and on a limestone cliff; some, and probably most, were taken by sweeping.

DISTRIBUTION: Caroline Is. (Palau).

Genus **Phronia** Winnertz

Phronia Winnertz, Zool.-bot. Ges. Wien, Verhandl. **13**: 857.

Type species: *P. rustica* Winnertz.

Anepisternal bristles present; pteropleurite bare. Hind coxa without subbasal bristle; hind tibia with posterior apical comb; tibial setulae in regular rows; tibial spines about as long as diameter of tibia. Wing with vein Sc ending free; M3+4 relatively short, forking from Cu1 well distal to level of anterior fork.

A species from the Bonin Islands belongs to the Holarctic group in which ornamentation is rather obscure and the front tarsi of the female are laterally flattened. It appears to differ in ornamentation from any of the Palaearctic species described by Landrock (1926). As far as I know, the only species yet recorded from the Oriental Region is *P. praecox* from Japan (Okada, 1936). Brunetti's (1912) and Enderlein's (1910) species were shown by Edwards (1924b) to belong in *Exechia*.

15. **Phronia boninensis** Colless, n. sp. (fig. 6, *a*).

Female. *Head:* Dark brown above, down to the level of the tiny median ocellus; pale brown with a darker median line above antenna bases. Face and mouth parts pale yellowish, though palp segments 2 and 3 appear rather darker in some lights; palp segments approximately in ratio 2:3:4:6. Antenna with segments 1 and 2 pale yellowish, each with a strong dorsal bristle; segment 3 yellowish on basal half; remainder of flagellum dark brown; segments 4 to 15 about as long as broad.

Thorax: Pronotum yellowish, mesonotum dark grayish brown, indistinctly paler at humeral margins; bristles quite strong, dark brown. Scutellum and postnotum dark brown, the former with 2 pairs of strong marginal bristles and some tiny setae between them. Halteres pale yellow. Pleura yellowish, except for the dark brown pleurotergite and hypopleurite; propleuron with 2 strong, down-curved bristles; anepisternite with a row of 3 rather small bristles; pleurotergite with about 4 major setae and 6 smaller ones; hypopleurite with 2 small bristles on posterior margin.

Legs: Coxae mainly pale yellowish; fore coxa with small black spot anteriorly at apex; hind coxa with rather indistinct brown mark externally on apical third. Femora and tibiae mainly brown; hind femur dark brown on apical third and along ventral margin; hind tibia slightly darkened at apex; tibial spurs brown. Mid tibia with 3 anterior and 2 dorsal spines, and posterior and posteroventral rows of small bristles; hind tibia with 5 to 7 anterior and 6 to 7 posterodorsal spines, and 1 to 2 small posterior spines toward apex. Fore tarsus darker than on other legs, segments 2 to 4 and apex of segment 1 laterally flattened, enlarged, with finely setulose ventral keel. Claws with small basal tooth; empodium distinct.

Wing (fig. 6, *a*) with slight brownish tint; length 2.4 mm. Costa extending only a little past apex of R5. Sc very faint, apically obsolescent. M3+4 relatively short, very faint, not quite reaching margin. 1A very faint, barely visible. Common base of posterior veins with several tiny setulae on upper surface.

Abdomen: Dorsum mainly dark brown; segment 1 broadly pale laterally; segment 2 with large, pale, laterobasal patches, extending to cover posterolateral angles of segment; segment 3 with broad, pale, basal band, produced along entire lateral margin; segment 4 with similar but narrower band, incomplete centrally; segment 7 brown, but paler than segments 5 and 6. Venter pale yellowish. Terminalia dark brown.

Holotype, female (US 67958), Omura, "Camp Beach," Chichi Jima, Bonin Is., April 2–25, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima).

Genus **Epicypta** Winnertz

Epicypta Winnertz, 1863, Zool.-bot. Ges. Wien, Verhandl. **13** : 909.—Lane, 1954, Rev. Brasil. Ent. 2 : 114.

Delopsis Skuse, 1890, Linn. Soc. New South Wales, Proc. II, **5** : 623.

Platurocypta Enderlein, 1910, Linn. Soc. London, Trans. II, Zool. **14** : 76.

Plastacephala Enderlein, 1911, Stett. ent. Zeitung **72** : 176.

Allophallus Dziedzicki, 1937, Mus. Zool., Ann. **13** : 31.

Neoepicypta Coher, 1949, Ent. Rio de Jan., Rev. **20** : 172.

Anepisternite and pteropleurite both with setae; anepisternite usually rectangular; longer than its vertical height, and distinctly larger than the other pleural sclerites which are much reduced. Wing with vein M3+4 present, more or less parallel to M2 and divergent from Cu1; 1A ending near base of M3+4.

The above definition and synonymy follow Lane (1954). *Neoepicypta* was proposed by Coher (1949) to include species previously placed under *Delopsis* by Edwards (1925) and subsequent authors, *Delopsis* being actually a synonym of *Epicypta*. Lane (1954) subsequently produced grounds for amalgamating all the above genera, and I am here following his concept. I suspect that future work will provide grounds for reviving some of these genera, but redefinition is clearly required. The trivial nature of the produced costa is well illustrated by the two Micronesian species described below;

these are obviously close relatives, but the costa is distinctly produced in one species only. It should be noted that Lane's diagnosis of *Epicypta* gives the tibial setulae as irregularly arranged, with some partial exceptions. I find that, in at least some non-American species, this character does not apply.

The two Micronesian species have a distinctive structure of the male terminalia, similar to that of the Palaearctic *E. aterrima*. Segment 7 is reduced, the tergite being cut away basally and ribbonlike dorsally, and the sternite small and apically emarginate, forming two small, hairy lobes. Segment 8 is also reduced, but distinct, cut away apically and very narrow dorsally, the sternite small and rather "waisted." Ventrally, the intersegmental membranes between segments 7 to 8 and 8 to 9 both have a median, apodemelike, sclerotized strip, apparently part of the mechanism for retracting the terminalia within segment 6. The ninth tergite and sternite, with the coxites, are apparently fused into a capsulelike structure, with a median, ventral projection. The styles and various basal processes are recognizable as are the prominent cerci, but there is a pair of median, lateral processes, whose basal connections give no immediate clue to their homology with known structures. I am inclined to regard them as apical processes of the fused coxites and have referred to them as such below; however, Lane (1954) appears to regard them as processes of tergite 9. Sternite 10 is also very characteristic, with a pair of strong, hooked spines.

In general structure, the terminalia agree with those figured by Lane (1951, p. 327; 1954) for Neotropical species, but, in detail, they are difficult to reconcile with any of his subgenera. Similar difficulty is found in other characters and I feel that the world fauna will have to be studied in greater detail before subgeneric concepts can be usefully employed.

The two species described below are clearly related to each other, and to the Palaearctic *E. aterrima*, (and presumably *E. scatophora*) and the Oriental *E. seychellensis*, *E. sumatrensis*, and *E. borneensis*. However, both are distinguishable on characters of the wing alone.

16. Epicypta palauensis Colless, n. sp. (fig. 7, *c–e*).

Male. *Head:* Vertex shiny, finely pitted, mainly very dark brown, but paler between antenna bases. Face brown, paler than vertex. Labella and palps pale yellow; palp segment 3 about as long as 2; segment 4 about twice as long as 3. Antenna yellowish brown on more basal segments, grading to dark brown on more apical segments.

Thorax: Entirely dark brown, except for a narrow, rather indistinct, paler band across anterior margin of mesonotum. Mesonotum shiny, pitted, with mostly dark-brown setulae that become longer and pale posteriorly; also with the usual posterior row of 6 strong bristles. Scutellum with pale setulae on disc, 4 strong and 2 weak marginal bristles. Halteres white. Pleural setulae pale. Pronotum and propleuron fused, with an oblique row of 3 to 4 dark bristles. Anepisternite with posterior row of 4 to 5 dark bristles; pteropleurite with 2 bristles; pleurotergite with 1 strong bristle and 1 to 2 weaker setae dorsally; hypopleurite with minute setae.

Legs: Coxae and femora yellowish, the latter darkened along their dorsal borders; tibiae brown; tibial spurs and tarsi dark brown. Tibial bristles (excluding those at apices) as follows: fore leg, 2 posterodorsal, small; mid leg, 5 dorsal (the more apical one set a little posteriorly), 2 to 3 anterior, 3 to 4 ventral (the most apical one very long), and 1 posterior (toward apex); hind leg, 5 to 6 posterodorsal, 5 anterior, and 5 to 6 posterior (small, on apical half of tibia). Tibial setulae arranged in rows, the dorsal row on hind leg much more conspicuous than others.

Wing (fig. 7, *c*) with yellowish tint anteriorly; length 2.0 mm. Costa produced a short distance past R5. Sc very short, ending free. Stem of median fork a little longer than r-m. 1A ending a little distal to base of M3+4. Branches of M and Cu barely reaching margin. Common base of posterior veins with a group of tiny setulae.

Abdomen strongly compressed laterally. Tergites dark brown above, grading to pale yellow brown at their lateral (i.e. ventral) margin. Venter with a pair of strong bristles

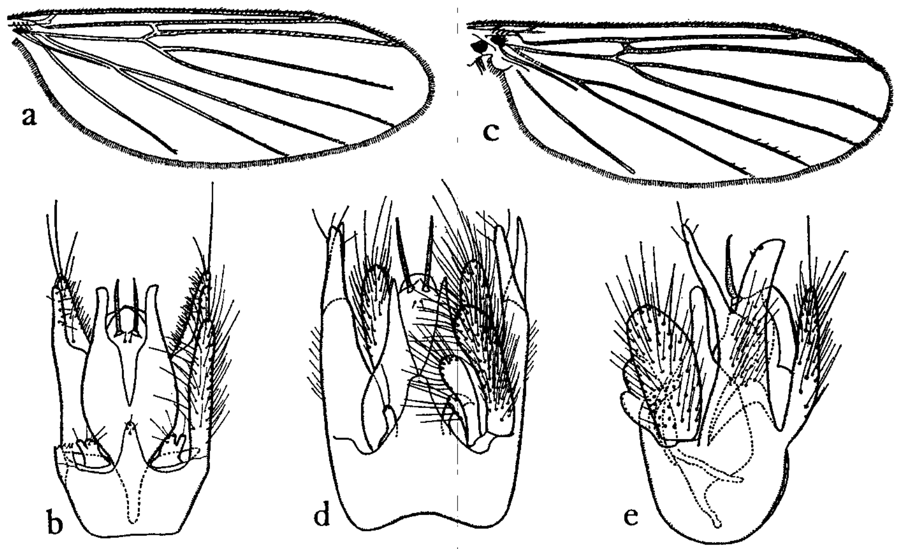


FIGURE 7.—**a, b,** *Epicypta boninensis: a,* wing; *b,* male terminalia, ventral view. **c–e,** *E. palauensis: c,* wing; *d,* male terminalia, ventral view; *e,* same, lateral view.

at apex of segment 2. Terminalia (fig. 7, *d, e*) retracted within segment 6, the protruding parts dark brown. Fused coxites with median process bare, curved dorsally; styles broad, hairy; 2 pairs of accessory processes, the larger (external) pair each bilobed, the internal pair very small, each with 2 apical setae. Apical process of coxite bifid, ventral arm fingerlike, the dorsal arm rather bladelike. Cerci long and narrow. Aedeagus with a pair of long, tapering, apical processes.

Female. Similar to male.

Holotype, male (US 67959), Malakal I., Palau Is., May 2, 1957, Sabrosky. Allotype, female, Melekeiok, Babelthuap I., Palau Is., May 23, 1957, Sabrosky. Three male paratypes, two with data as for holotype; one, Airai, Ngerimal R., Babelthuap I., Palau Is., May 26, 1957, Sabrosky.

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is viewed at an angle); segment 10 relatively large, with conspicuous cerci and membranous sternite. Coxites completely fused; styles hairy, globular, hollowed, with rather strong spines at apex, dorsal side with pointed basal lobe and hairy, rounded, subapical lobe. Aedeagus largely membranous, supported by 2 lateral apodemes, these bifid, with rounded ventral arm and narrow dorsal arm.

Holotype, male (US 67961), Netkeng, Imeliik, Babelthuap I., Palau Is., June 5, 1957, Sabrosky. Paratype, male, Ngiwal, Babelthuap I., May 21, 1957, jungle, Sabrosky.

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